Example #9: The nucleus of a certain atom has a mass of 3.8×10^{-25} kg and is at rest. The nucleus is radioactive and ejects a particle of mass 6.6×10^{-27} kg and speed 1.5×10^{7} m/s. Find the recoil velocity of the remaining nuclear mass left behind.

before

$p_T = 0$

after

$p_T = (6.6 \times 10^{-27})(1.5 \times 10^{7}) + [(3.8 \times 10^{-25}) - (6.6 \times 10^{-27})]v$

the remaining mass

$0 = 9.9 \times 10^{-20} + 3.734 \times 10^{-25} v$

$v = -2.7 \times 10^{5}$ m/s